Knowledge Management Newsletter

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Open Access Initiative: Update

By David Oberhettinger

Do you have access to the information you need to do your job?

First on the list of JPL core values is "*Openness of our people and our processes.*" Yet despite widespread agreement that most project knowledge should flow freely within JPL, the process by which an individual gains access to another project's DocuShare® library may appear somewhat arbitrary-- and often fruitless.

The Office of the Chief Engineer and the Office of the Chief Information Officer have teamed to promote an Open Access Initiative. The objective is to remove arbitrary restrictions on universal "read" access to project knowledge in DocuShare®. However, this effort must remain attuned to the need to protect certain sensitive content, like personnel financial and third-party proprietary documents, from unauthorized disclosure. In January 2015, the Open Access team demonstrated to the Project & Engineering Management Committee (PEMC) new tools that can screen out such content from search results. The PEMC concluded that the application of these tools offers JPL a low risk of sensitive disclosures, and the PEMC authorized the team to take steps to remove most access restrictions.

Removal of access restrictions on an initial set of project libraries, including MSL, Dawn, and SMAP, is scheduled for late Spring. The team is also working on rolling out an employee authentication tool that will allow sensitive programmatic information to be restricted by employee role (e.g., accessible to Manager Level III and above). As not all project libraries meet the same archival standards, a set of best practices for such steps as document metadata entry will be documented.

KM Champion's Corner

Capturing Valuable Mission Design & Navigation Knowledge

By Amy Attiyah, Ian Roundhill, and and William Taber

Legacy mission design and navigation data (data, documents, and software) have been recognized as essential to future missions. However, access to such valuable data has not been given much attention in the past. A decade ago, during a safety walk through, Mission Design and Navigation (MDNav) Section personnel discovered 30+ boxes of reels and tapes under a stairwell that contained archived navigation data. There was no system, process, nor procedures in place to better preserve such important data to improve future mission trajectory design and navigation planning.

Because JPL lacked an established institutional archival service that met MDNav data archival requirements, MDNav implemented a solution to capture, retain, and store online archived data. In 2007, the System for Archival of Navigation Data (SAND) was developed to archive and ensure accessibility of Mission Design and Navigation data on current online media as well as ease its transfer to future media. The system is comprised of high-end storage, a user accessible client, and a process for use within the multimission MDNav infrastructure and environment.

The solution has been successful in preventing the recurrence of the 'under the staircase' scenario. SAND users began to regularly use previous mission data in their analysis and preparation for future missions. For example, MER cruise data was used to test the new navigation software toolset (MONTE) in preparation for Phoenix navigation. MER data was also used to refine the trajectory models for MSL such as the Solar Radiation Pressure model and to test new scripts such as the spin signature removal tool.

Although SAND users now enjoy online availability of over 12TBs of data that cover all phases of previous projects, infusing archival submission activities into the regular processing of current mission data remains a challenge. The SAND data contribution step is now manual and does not provide sufficient metadata to properly track information over its lifetime. In 2012, MDNav system engineers in collaboration with the section software developers and SAND users began developing autoSAND—automated software and a set of procedures to conserve and manage future archived data. This automated system is presently in alpha testing. We plan to fully deploy autoSAND in 2015. We expect the improvements in software, hardware, and process to significantly increase the data archival rate and enhance user search experience. MDNav System Engineers envision a day when preserving mission design and navigation data is integrated into the normal analysis workflow. For example, after completing a reconstruction of a Cassini data arc, the last step would be a script call to autoSAND to preserve this solution. The autoSAND system is an essential enabler of this vision. We will continue to foster the change in the workflow processing to achieve this goal.

Legacy mission design and navigation product retention is an invaluable resource for designing, improving, and developing new trajectories and navigating new spacecraft. In addition, it has also assisted in resolving old mysteries. For example, we restored, recovered, and captured Mariner-10 tracking data from fragile old media for use by Messenger scientists. We recovered and captured Pioneer-10 tracking data to assist in explaining the cause of the Pioneer flyby anomaly. While helping to solve the mysteries of the past, we look forward to navigating the missions of the next decade by learning from the products to be captured by autoSAND.

Veterans of the Mars Campaign

By David Oberhettinger

It is likely JPL will remain in the Mars rover business for the foreseeable future. But with the overriding goal of getting a flight system and instrument suite ready for launch, a project may place

lesser emphasis on capturing and preserving critical knowledge gained over the project life cycle. Replacing such knowledge will not only incur costs, but because the heritage knowledge has already been proven in test and flight, it will also entail added risk by using untested designs.

The OCKO is conducting filmed interviews with key Mars rover project veterans in which we asked them, "*What does the Mars 2020 Project (and future rover projects) really need to know, but hasn't thought to ask you?*" Actually, M2020 has actively sought the participation of Mars Science Laboratory (MSL) development and operations personnel at peer reviews, but key personnel may not always be available to explain the factors that led to MSL's success.

Interview subjects include Rob Manning (program management), Richard Cook (project management), Ben Cichy (flight software), Joel Krajewski (V&V), and others. The video interviews are being uploaded to *JPL Tube*, where they are full text searchable under the search string "Veterans of the Mars Campaign."

For Your Consideration

If that document was worth writing, perhaps it should be stored where it can be retrieved for possible reuse-- not just on your hard drive.

Video is the New Document, Pt. 2
By Charles White

In the previous issue, David Oberhettinger pointed out that high quality video capture of technical interchange no longer requires special equipment or skills—a cellphone propped up on a conference table may be sufficient.

If your organization plans to capture meetings and seminars on a regular basis, though, more sophisticated consumer-grade technology is available at low cost. This may range from a small digital video camera, to multiple cameras wirelessly slaved to one or more independent miniature sound recording devices. Whether you use a cellphone or go with the rapidly advancing dedicated video hardware products, here are a few helpful hints:

- Some minor video editing will likely be necessary to remove undesirable content, but video editors are generally easy to use. The Windows and Mac operating systems include free video editors.
- An inexpensive lightweight tripod, or miniature table tripod, is very useful.

- A video camera needs a memory card of sufficient size, and a clean reformatted card should be used for each session.
- Because quality audio capture presents the biggest challenge, consider using either a wired lapel microphone or a wireless lapel microphone connected to external audio recorders (below) with internal memory cards.

Consider designating one person on your staff to become familiar with the equipment, the video editing software, and the JPL Tube upload procedure. Over 2000 videos have been uploaded to JPL Tube, and the videos have been viewed 200,000 times.

Video is the new document!

JPL Case Study Resources
By David Oberhettinger

Case studies provide an engaging approach to learning by involving participants in a simulated decision making process that provides insight and sharpens analytical and management skills. The process typically involves a session facilitator guiding the participants in thinking through the choices made by decision-makers in the actual scenario, based objectively on the information that was available to the decision-makers at the time, so that the participant can analyze the scenario and propose alternative solutions. NASA has prepared a large set of case studies based on incidents ranging from NASA mishaps to the Bhopal disaster. However, JPL management has urged the creation of a set of case studies based specifically on JPL projects, so as to identify connections between incidents, systems, and processes familiar to JPL project personnel.

The OCKO has recently prepared some JPL-specific case studies, each including a set of suggested discussion topics, based on JPL incidents that appear instructive to future projects. The JPL website also provides a Case Study Methodology Guide, prepared by Dr. Ed Rogers of NASA Goddard Space Flight Center, that offers guidance to projects in writing additional case studies. His case study on The Sinking of the Vasa, conducted at JPL in February 2014 and stored on JPLTube, offers insight into case study presentation methods.

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